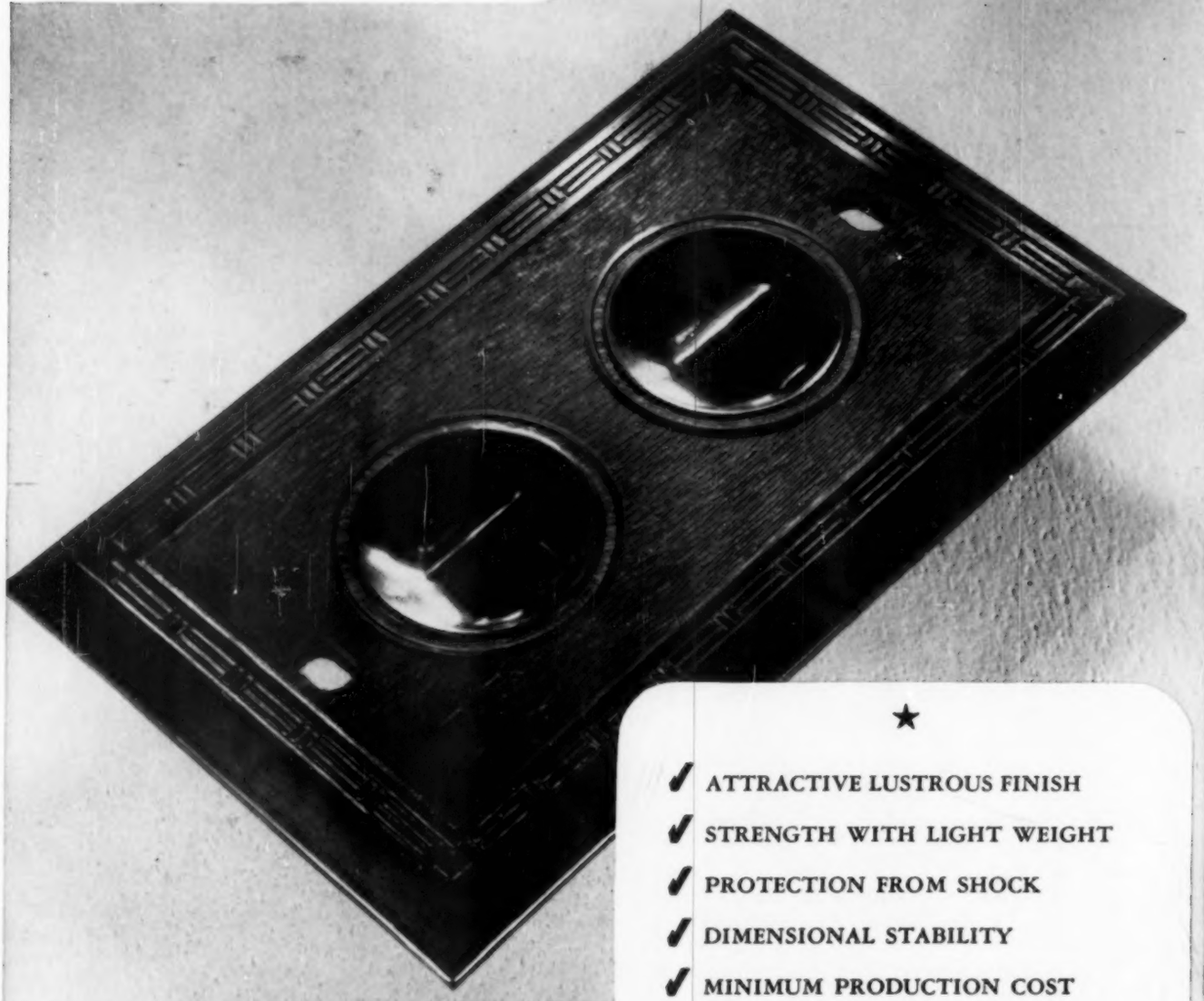
SPE JOURNAL

Richard Huber, conference chairman, receives plastic key to city of Cleveland from Mayor Thomas A. Burke. (Story on page 2)

Published by the Society of Plastics Engineers, Inc.

Volume 5, Number 9 November, 1949

DURITE



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SPE Journal

Published monthly except July and August by the Society of Plastics Engineers, Inc.

ISSUED MONTHLY TO ALL MEMBERS OF THE SOCIETY OF PLASTICS ENGINEERS

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S.P.E. Means You!

Because frequent references are made to the American Chemical Society every time SPE organizational and service problems are mentioned, your editor found it extremely interesting to hear a talk given by Alden Emory, executive secretary of the ACS before a gathering of chemists at Marietta, Ohio who were forming a new local section of ACS.

Mr. Emory, speaking of the ACS, said "The national office is a collecting point for ideas, and an **ignition point for action.**" He also remarked that if the policies and programs do not meet the needs of the members, it is due to lack of flow of ideas from the individual members into the national office. The national office **implements** the desires of the members. The big problem of ACS is getting across to the members what the national society is doing for the member.

In view of the fact that ACS is the most successful of technical organizations, it is interesting that precisely the same problems confront SPE, and that the solutions are precisely the same.

The prescription for an even better SPE is simple: let the **individual member** but express his opinions, **his** likes and dislikes to the national SPE office at Athens, Ohio. Let him make his ideas and wants known, to the national and to the local section officers.

Got ideas? Let's **hear** them!

SPE JOURNAL

Volume 5 **Number 9**

Published monthly except July and August by the

SOCIETY OF PLASTICS ENGINEERS, INC.
409 SECURITY BANK BLDG.
ATHENS, OHIO

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Ortigeies & Dillon
155 East 44th Street
New York 17, New York

$.30 a copy **$3.00 a year**

Application for entry as Second Class Matter pending.

CONVENTION PLANS AND SPEAKERS ANNOUNCED

LADIES PROGRAM PLANNED

The City of Cleveland, in the person of Mayor Thomas A. Burke, presented the key to the city to S. P. E., represented by Richard L. Huber, Hercules Powder Co., the Conference Committee Chairman, in ceremonies taking place in City Hall on October 24th.

The large plastic key used in the ceremonies was made by the House of Plastics, Cleveland, Ohio.

The Sixth Annual National Technical Conference to be held in the Carter Hotel on January 11, 12 & 13th is expected to draw in the neighborhood of 700 experts in the plastics field to Cleveland. The material suppliers, machinery and tool manufacturers are being invited to have representatives in attendance at the conference so that the individuals attending the conference can obtain the latest information on the developments in the industry and seek the solution to problems in his own plant.

Some of the speakers and topics for the technical sessions will be:

Gilbert Thiessen, Koppers Company, Inc., "Raw Materials for the Plastics Industry". C. J. Snyder, Koppers Company, Inc., "Field Molding Problems and their Solutions". A. J. Gaio, John Waldron Corp., "Machinery for Plastic Coating". T. J. Kerr, Yardley Industries, Inc., "The Plastics Calendar and its Auxillary Equipment".

Merrill J. Ainsworth, Engineering Consultant, "The Electrosol Process—A New Development in Elimination of Electrostatic Accumulations in Plastics".

Hans E. Buecken, Nation Rubber Machinery Co., "Controversial Points of Extrusion".

S. D. Hiltebrant, The General Industries Co., "New Developments in Thermosetting Molding".

Elmer E. Mills, Elmer E. Mills Corp., on constructive improvements in design of injection molding equipment from the user's standpoint.

James W. Hendry, Jackson and Church Co., on new developments in injection molding machines-8oz. capacity and larger.

L. F. Street, Welding Engineers, Inc., on double-screw mixer.

M. S. Greenhalgh, General Electric Co., on extrusion equipment—views of the plastics processors regarding the design of presently used machinery.

G. V. Kullgren, Adamson United Machine Co., on developments of new type mixer or compounder—or calendar design or practice.

E. Green, Hartig Engineer and Machine Co., on new improvements in plastics extrusion Equipment.

Stanley Cash, Continental Can Co., on continuous laminating.

A luncheon is planned for noon on Wednesday, the 11th, at which Dr. Gilbert Thiessen will be the guest speaker and a banquet is to be held on Thursday evening with a speaker of national prominence.

This year the ladies attending with their husbands will have a program of their own. A fashion show, a home decorating show and a plant trip are on the tentative schedule of Mrs. G. A. Fowles, a prominent Cleveland club woman, who is handling the arrangements for the ladies. And, of course, they are invited to the luncheon and banquet.

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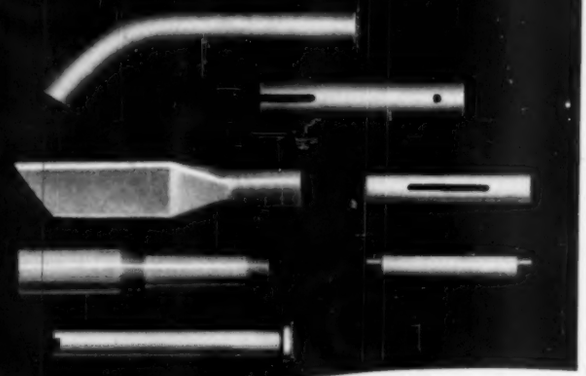

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PLASTICS MOLDING
—A SURVEY OF METHODS

By RICHARD J. FRANCIS

Mr. Richard J. Francis is a consulting engineer in the plastics and other fields of engineering. He was a development engineer for the Emery Industries in Cincinnati, Plaskon Division of Libby-Owen-Ford Glass Co. in Toledo, Naval Ordnance Laboratory in Silver Springs, Md., and Owens-Corning Fiberglas Corp. in Newark, Ohio. In 1946 he received two individual Naval Ordnance Development Awards for earlier developments in the plastics and textiles fields. Mr. Francis received his degree of Chemical Engineer from the University of Cincinnati in 1934. He is a registered mechanical and chemical engineer in both the states of Ohio and Indiana.

The word plastic is a gereric term. It encompasses many types of resins most of which are synthesised, but a few of which occur naturally.

This diversity of resins provides a wide range of physical properties, which in turn has led to the development of many processing (or molding) techniques. Some of these techniques are described briefly.

By one classification there are two types of plastics, those which are thermoplastic, and those which are thermosetting. This classification is important since it is based on physical properties which vitally influence the technique selected for molding a specific part of a specific material.

THERMOPLASTIC RESINS such as polystyrene and cellulose acetate may contain dyes or pigments for coloring and may contain placticizer, but except for these modifers they are nearly pure resin both as received and as molded. In their natural state they are fairly transparent and free of color.

Since thermoplastics are linear polymers, they may be heated and cooled repeatedly. Generally thermoplastics are cast and injection, extrusion or blow molded. These three molding methods capitalize on the ability of the thermoplastics to soften when reheated and harden when cooled. Of the three the method selected for molding a part will be influenced largely by the shape to be molded.

Moisture in thermoplastics generally leads to surface defects in the molded parts. Consequently molders may provide storage space conditioned to minimize moisture regain. As a further precaution the material may be dried before molding.

THERMOSETTING RESINS such as phenolics, melamines, ureas, silicones and polyesters are almost always used with fillers or reinforcements. Heat makes them reactive, increasing their molecular size and cross-linking them to a heat-infusible solid. All except the polyesters con-

Richard J. Francis

dense and tend to liberate volatiles necessitating the application of molding pressure to keep the volatiles contained and to avoid blow holes. Polyesters may be polymerized without liberating volatiles, and hence may be molded with less applied pressure.

Molding compounds of phenolics, ureas, and melamines are "packaged" by the resin manufacturer complete with the proper ratios of resin, filler, plasticizer, coloring, mold lubricant, accelerator and/or inhibitor.

Plaskon's Alkyd Molding Compound is the only polyester type molding compound supplied by a resin manufacturer. It is the fastest curing of the molding compounds, and its unique combination of resin and inorganic filler provides molded parts with unusual electrical properties.

All of these thermosetting resins are used for laminating. The first four are supplied as dispersions of resins in liquids, and may be further diluted for easy application to reinforcements. Polyester resins however are supplied as 100% reactive resin in a polymerizable vehicle.

INJECTION MOLDING. Granules of thermoplastic are fed into a hopper. A plunger takes some and forces it horizontally into a heated zone. Here the combination of heat and pressure liquify the plastic. Under several thousand pounds per square inch pressure it flows through the nozzle of the injection machine, and through sprues and runners, into multiple cavity molds. Since these molds are chilled, sometimes by circulating warm or cold water, the plastic hardens in the cavities.

After removal from the mold the parts are cut from the runners and packaged for shipment. Runners and sprues are re-ground for re-use.

EXTRUDING. Granules of the resin are picked up continuously by a screw turning with slight clearance in a housing. On being forced through a heated area, this heat combined with pressure from the turning screw liquifies the plastic and subsequently forces it through an orifice.

Contours of the openings in the nozzle determine the shape of the extrusion, which may be sheeting, tubing, coating on wires, etc. Often the shape in the orifice must be exaggerated to compensate for "snap-back."

As the material emerges from the orifice it is still warm and hence soft. Some types of thermoplastic can be cooled by a cold water quench. Others must be cooled more slowly, in a water spray, or in air.

Generally the units extrude horizontally, but some shapes are handled more efficiently by extruding downward.

BLOW MOLDING. Bulk glass has many handling characteristics similar to those of themoplastic resins, and therefore it is not surprising that some of the techniques used in blowing glass have been adapted to form thermoplastics.

With suitable tooling a heated thermoplastic sheet can be blown into a cavity to make a shape as a hemisphere. Hot air introduced between two heated thermoplastic sheets clamped at the edges can produce a

PLASTICS MOLDING—

(Continued from preceding page)

shape as a sphere. Also, a heated thermoplastic cup can be blown into a bottle-shaped container.

COMPRESSION MOLDING. In a simple compression molding operation, the molding compound is placed in a heated mold cavity. As the force enters the cavity, the compound is fused and flowed to all parts of the cavity. Since the filler, which may account for 40 to 60% of the weight, is finely divided (generally a cellulose derivative such as wood flour or alpha cellulose), it flows with the resin.

The mold remains closed until the resin is thermoset, after which the parts are ejected with pins as the mold opens. Except for large parts multiple cavity molds are generally used.

In addition to the general design considerations for plastic molds, the molds must be designed to maintain pressures on the resin in excess of 1,000 PSI during the early stages of cure. Molds with full positive type closure accomplish this although a semi-positive type of cut-off is preferred because it flashes out excess plastic, providing parts of uniform thickness.

Molding compounds are manufactured as granules or as powders, but for convenience in handling, the compounds are often preformed into large tablets or pellets. Often these preforms are preheated by any of the conventional methods including steam, high frequency, infra-red, or hot air. Preheating improves the flowing characteristics and reduces the curing time.

TRANSFER MOLDING. In this method the charge of molding material is placed in a transfer chamber, where heat and pressure tend to liquify it. When properly plasticized the material is forced from the pot into the mold cavity where it is held under pressure until thermoset. The molding compound may be preheated.

PLATEN LAMINATING. Platen presses, with one or more openings are well established as a means of forming laminates of thermosetting phenolic, melamine, silicone, and polyester resins reinforced with webs of cotton, paper, sisal, and glass.

As a preliminary step the resin and reinforcement are combined in a treating operation. Here a web of reinforcement is passed continuously through a dip tank containing A-stage resin diluted to the desired consistency with solvent. From the dip tank the web passes into a heated zone, where solvent is removed and the resin is advanced to a non-tacky B-stage. Commercial treaters, such as Plastics Specialities Co. of Trenton, Michigan, supply various combinations of reinforcements treated with different resins to the industry.

For all except the polyester, laminating pressures generally exceed 1000 psi, and there is little incentive to reduce the laminating pressure. An exception is the case of a wood core laminate made in one pressing. Laminating pressure should not exceed the flatwise compressive strength of the wood, which may be of the magnitude of 250 psi, depending on the type of wood used for the core.

Excess resin flashes along the edges, and the laminates are subsequently trimmed to the desired dimensions.

CONTINUOUS LAMINATING. Continuous laminating lends itself to the rapid production of thin laminates, generally with a printed surface sheet for decoration. Webs of reinforcement, such as paper or cloth pass through individual dip tanks, through individual metering rolls which control the resin take-up, and into a combining head, where the webs are plied and where surface sheets of a material such a cellophane are applied to the top and bottom surfaces of the laminate. The cover sheets are slightly wider than the webs, and as the plies emerge from the combining head, the cover sheets are clamped together in this excess width by a mechanism such as a textile tenter frame. After the resin is thermoset by passing continuously through a heated zone, the cellophane is removed.

In one variation of continuous laminating the webs of reinforcement may be treated with resin and allowed to soak for a few hours or a few days. Soaking allows denser webs to be used, with more reinforcement in the final laminate.

Or the assembly coming from the combining head may be led over metallic arch or intermittently, into a laminating press. The applied pressure provides denser laminates, and the metal platens not only apply heat faster but also buffer the curing exothermic heat.

Polyester laminates may be of the rigid type, or by blending rigid and flexible resins, laminates may be flexible.

MATCHED METAL MOLDING. The techniques and tooling are similar to those for compression molding, but this special terminology is sometimes used to indicate the molding of reinforced plastic parts. More specifically it is used to describe the molding of glass reinforced polyester parts. In this case the reinforcement is placed in the cavity and a measured quantity of resin poured on the reinforcement. Lower molding pressures can be used, and consequently molds and presses are less massive than those used in compression molding. Since both the force and cavity are metal, both the inner and outer surfaces of the molded parts are reasonably smooth.

Flow characteristics of phenolics, melamines, and silicones are sluggish, while reinforcements of cellulose (cotton, paper, pulp, etc.) asbestos and nylon are somewhat resilient. Combinations of these resins and reinforcements permit slight variation in the distribution of the reinforcement. However, when fibrous glass and polyester resins are used, the positive pressure of molding may concentrate if there are thick areas in the reinforcement. In extreme cases the less resilient glass reinforcement may be crushed and excessive resin may be flowed from the thick area, leaving "starved" sections in the cured parts.

To provide a more uniform distribution of glass for molding, several companies have installed equipment for making preforms of fibrous glass. In the operation glass fibers about two inches long are suspended in an air stream and collected on a screen approximating the shape of the part to be molded. With the addition of suitable resin binders, the preforms

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can be handled and shipped.

Tubular Weaving Company of Columbus, Ohio is equipped to do custom molding of pre-formed glass reinforced plastics, and in addition, offer the preforms to companies that prefer to do their own molding.

On an experimental basis small parts of simple shapes have been molded of glass reinforced polyester on a thirty-second cycle. The mass of metal in the heated mold provided a generous source for heat to bring the resin quickly to temperature. The resin was further heated by the exothermic heat liberated by the curing polyester, while the buffering action of the mold and reinforcement being heated kept the exothermic heat rise from being excessive.

DIFFUSION MOLDING. One of the newer techniques in molding polyesters derives from the injection molding of thermoplastics. With the mold closed on the reinforcement, liquid polyester is pumped into the space occupied by the reinforcement. The fibers must be positioned securely, or the flowing resin will tend to wash them along the path of flow. Fabrics give no trouble in this respect, but since the market for glass reinforced plastics favors mat or preform products, this displacing tendency is a vital factor in molding.

Heating the resin lowers its viscosity, speeds injection rates and reduces the tendency of the resin to wash away the fibers.

RUBBER PLUG MOLDING. This method uses a metal cavity and a rubber force, generally referred to as a rubber plug.

The chief advantage of the rubber plug is that it will accommodate slight irregularities in the thickness of the reinforcement, with irregularities resulting on the surface of the molded part adjacent to the rubber plug. It might be favored over matched metal tooling for short runs since tooling is simpler. However, the life of a rubber plug may be only a few hundred parts.

Rubber plug molding has been limited to phenolic and polyester resins. Polyesters are inhibited by rubber so that the rubber surface must first be covered with cellophane or with a spray coating of certain thermoplastics. With phenolic resins, it is customary to surface the rubber with a rubber lubricant to prevent sticking.

With polyester resins the reinforcement is placed in the mold cavity and the liquid poured on top of it. When using phenolics it may be desirable to invert the metal cavity over the rubber plug. The phenolic treated reinforcement then can be positioned accurately over the rubber plug, and as the mold closes, the dry phenolic slides easily over the smooth surface of the mold.

DIAPHRAGM MOLDING. Diaphragm molding uses male or female molds of metal, wood, plaster, etc., and diaphragms of cellophane, rubber, polyvinyl alcohol sheeting, etc. Several variations are in use, most of them using from vacuum to 100 psi molding pressure, and with few exceptions, their usefulness is limited to molding prototypes, those first working models that are useful to check styling, performance, and marketability.

In one variation a tailored rubber diaphragm is clamped about its periphery between a metal plate and the rim of a mold cavity. Air between the diaphragm and plate forces the plastic into intimate contact with the heated mold cavity.

Some safety helmets are molded in hat presses. Limited to parts measuring 20" or less in diameter, molding pressure is exerted on the plastics lay-up thru a flexible rubber diaphragm by manually operating a lever which also opens and closes the press.

In another variation the mold and plastic lay-up may be sealed in an envelope. Or a diaphragm may clamped to the edge of a mold over a plastics lay-up. Evacuating the assembly holds the plastics lay-up securely against the mold. When the laminating resin is a polyester, the plastic may be cured in a hot air oven, or if catalysed with benzoin, by sunlight. When the laminating resin is a phenolic, requiring somewhat higher mold-

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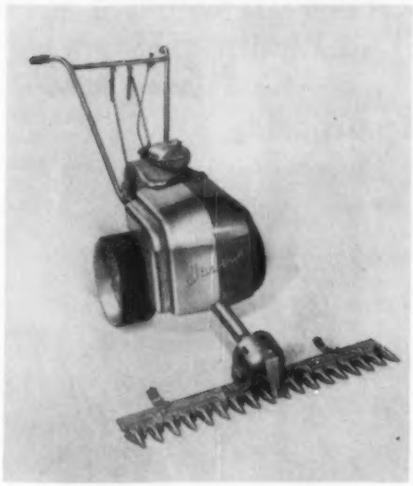
MATCHED MOLDING



(Photo courtesy Tubular Weaving Co.)

Typical of the uses for matched metal molded parts of glass reinforced plastic is this housing for a power scythe. In addition to unusual coloring possibilities it provides accoustical insulation and resistance to denting.

JAX PLASTICS, INC.
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ONTARIO HOLDS FIRST REGULAR MEETING

By J. N. KEMPF

The meeting of the Ontario Section was held in the Main Lounge of the Woodgreen Community Center in Toronto. The meeting was brought to order by Mr. R. E. Reichardt, General Chairman, who gave a brief talk concerning the objects of S.P.E. and then introduced Mr. T. E. Orr of Cleveland. Mr. Orr is a past president of the National Organization and Vice-President of Plastics Engineering, Inc., Cleveland, Ohio. His talk was a very informative one concerning organizational procedures for local S.P.E. sections. He outlined the basis on which local sections could be organized and discussed the work that some other sections are doing with regard to furthering the technical aspects of the plastics field. He pointed out the assistance that the National Organization could give to local sections with regard to guest speakers, films, publications, etc. His discussion regarding the activities of various National Committees such as the Credentials Committee and Educational Committee on plastics was very interesting and informative. At the conclusion of Mr. Orr's talk there was a brief question period followed by an expression of thanks given by Bob Reichardt to Mr. Orr for his informative discussion.

Mr. Finley McEwen and Murray Scott jointly introduced Mr. Gordon Thayer, the guest speaker of the evening. Gordon Thayer is the Technical Service Manager, Plastics Division, Dow Chemical Company, Midland, Mich. This lecture was highly informative and well illustrated with slides concerning Controlled Flow and Balanced Gating Techniques in the Molding of Thermoplastics, such as polystyrene. Some of the subjects contained in Mr. Thayer's illustrated lecture concerned: control of the plastic flow in the cavity; mold temperature control; sticking of the parts in the mold; restricted gating; gate balance on single and multiple cavity molds.

A stimulating question period followed Mr. Thayer's talk and apparent interest in his subject was readily shown. On conclusion of the question period an expression of thanks was given by Finley McEwen to Mr. Thayer for a most interesting and well illustrated lecture.

A roster of the members and guests present at this meeting indicated that there were twenty nine persons present and of this number, twenty three persons expressed interest in future meetings of the Ontario Section. It was decided by the officers present that a business meeting for the purpose of electing permanent officers, a section Board of Directors and a Credentials Committee should be held on Monday evening, November 7.

ACETATE, BUTYRATE USES IN FILMS, PACKAGES AND METAL LAMINATES

Vernon Howe of Kodak tells how gold cloth is improved in talk at Balt.-Wash.

By HARRY C. WILLIAMS, JR.

The Baltimore-Washington Section of the Society of Plastics Engineers, in their opening meeting at the National Bureau of Standards, on September 20, 1949, had the pleasure of hearing Mr. Vernon M. Howe of the Cellulose Products Division, Eastman Kodak Company speak on the applications of cellulose ester plastic films and sheets. His talk was illustrated with several colored slides.

He called attention to the fact that molders or users of plastics parts had been aware for a long time of the outstanding toughness, ease of molding, and wide color range of cellulose esters, but that few plastics men are aware of the versatility of these same base materials when used in the form of films or sheeting as produced by manufacturers such as Celanese Corporation, Du Pont, Eastman Kodak, and Monsanto Chemical Corporation. He mentioned that the sheet fabricator works with continuous film or sheets gauging from .003 to .020 or from skived and extruded sheets to approximately ⅛" in thickness to produce parts requiring thinner wall sections or runs which could not justify the cost of expensive molds. He explained that three methods, casting, skiving, and extrusion were used to produce cellulose ester films.

In casting, he said that the base ester and suitable plasticizers are dispersed in a solvent such as acetone and cast on a mirror surfaced wheel or belt enclosed in a chamber through which hot air is circulated. When sufficient solvent has been evaporated to permit the sheet to support itself, it is stripped from the wheel or belt and the curing completed by passing it over dryer drums or through an air section where the remaining solvent is removed by a blast of heated air.

He described the skiving technique in which a dough-like mixture of the esters and plasticizers with a very small amount of solvent is pressed into a large cake and sheets of varying thickness removed by a plane-like arrangement which shaves off layers of any desired thickness from .005 and up. A modification of this system, known as mandrel skiving, has been used wherein a setup similar to that used in producing veneer is employed. In this method the plastic block, in the form of a cylinder, is mounted on a lathe and a continuous sheet or strip "peeled" off by means of a wide knife. After sheeting, the skived stock is cured by hanging in a well ventilated room. Polished or matte surface sheets are produced by hot pressing the skived sheet.

An extrusion method has also been developed in which plastic pellets are forced through a heated cylinder by means of a rotating screw until the plastic mass is softened to the point where it may be forced through an anular or flat die to produce a continuous sheet. Gauges produced by this method run from .003" through .030".

Harry C. Williams, Jr.

By means of colored slides he demonstrated the various applications and manufacturing processes of cellulose ester film and sheets. Its use as transparent containers for fish hooks, candies, fancy nuts, dried fruits, etc. were shown. Sewing kits of these materials were also available, coming under the classification of re-use containers. The film and sheets find application in lampshades, office equipment, window envelopes, sound recording or "Nursery Rhyme" records, and magnetic sound tapes; electrical equipment such as coils, switchboard and radio hookup wire, and electric motors also depend on these materials as an insulating medium. The greeting card and novelties field also consumes considerable amounts of these cellulose ester films and sheeting. It finds use in Polaroid glare shields and sport glasses. Lamination consumes large quantities of these materials annually.

A new packaging material, consuming increasing quantities of cellulose acetate-butyrate, is produced by combining metal foil with a thin plastic sheet. One of these foil-laminated sheets is Metalam. Kodapak is printed in reverse and laminated to a thin sheet of alumnium foil. Besides carrying the printing, it adds toughness and protects the fragile foil whose main function is to provide a moisture-vapor barrier. The foil is coated with a heat sealing layer on the opposite side by means of which the Metalam may be sealed to itself on high speed packaging equipment. This material is ideal for packaging such items as Alka Seltzer, instant coffee, dried fruit juices, and penicillin, items which are readily handled by these tailored-to-measure packages which have made possible the widespread distribution of these materials. Its attractive appearance, chemical inertness, and exceptionally low moisture permeability. The fact that high speed equipment can be used in their manufacture makes production costs lower. A decided advantage, which the dealers appreciate, is the fact that there is no breakage in shipment with these packaging materials.

A relatively new and interesting development in the use of Kodapak II in the manufacture of a metallic yarn for the textile industry. Gold, drawn into exceedingly fine wires, was used in making tapestries, drapery fabrics and church vestments, according to early records of history. These metallics which were costly, would tarnish, develop an unpleasant "brassy" odor, were heavy and "scratchy." Kodapak II (cellulose acetate-butyrate), noted for its toughness and the fact that it can be stretched as much as 60 to 70% before rupture, has made possible the development of these metallics which are reasonable in cost and possess none of the objectionable characteristics of their forbears.

Lurex, a modern metallic is made by laminating to both sides of aluminum foil, gauging slightly under ½ thousandth of an inch, pieces of Kodapak II about 1½ thousands of an inch in thickness, by means of a transparent adhesive. The Kodapak provides transparency, strength, and a high degree of stretch—in addition to protecting the foil against tarnish. The first step in the manufacture of this material is the lamination of the Kodapak to the foil in 20" wide rolls. These master rolls are then cut into narrower rolls before the final slitting. In the final slitting, the "Kodapak sandwich" is reduced to strands as narrow as 1/80th inch. This is a critical operation and determines the tensile strength and "stretch" of the finished yarn. The metallic yarn is wound on specially designed spools for shipment to textile mills where it must withstand high speed weaving, vat dyeing, and other modern finishing techniques peculiar to the textile industry without loss in strength, toughness, or appearance. By weaving the gold metallic with Estron-Tennessee Eastman's acetate yarn—produces the gold cloth used in women's evening wear. dresses, and shoes. Fashion and fabric designers are finding new and fascinatinf possibilities for these Kodapak metallics in many new dress fabrics. A variety of upholstery and drapery fabrics combined with Lurex is another popular use;

(Please turn to page 10)

QUALITY CONTROL PROGRAM FOR PLASTICS INDUSTRY IS MAPPED

By JEROME FORMO

The Builders Club in Chicago was the meeting place of the Quality Control Sub-Committee of the Professional Activities Committee on October 12.

Jerome Formo in charge of research, developments, and materials control of the plastics laboratory of the Minneapolis-Honeywell Regulator Company heads the committee composed of: Marion Arthur, Humble Oil and Refining Co., Dale Amos, Amos Molded Products; William Hess, Anesite Corporation; William Graves, Western Electric Company; Don Greb, Minneapolis-Honeywell, Quality Control Department; Fred Tulley, Amos Molded Products; Louis Walter, General American Transportation Company.

Don Greb was called on to elucidate concerning the meaning of quality control and its possible use in the plastics industry. He established a suitable definition for quality control as it is presently understood as: "A branch of statistics which applies particularly to industrial processes." He indicated that numerous companies in other fields are using quality control with very gratifying results and expressed surprise at the fact that such an aggressive industry as the plastics industry has not as yet put this modern tool to any great use.

The need for establishment of standards of quality within the plastics industry is keenly felt. It was suggested that if the plastics industry did not soon establish cooperative standards it could lead to a serious deterioration of business. The role which quality control can play in establishing these standards is in analyzing the work which can be done to meet certain standards, and to interpret this in terms of dollars and cents. A collection of data pertinent to establishing such standards is the number one problem at present.

Dale Amos suggested the establishment and use of standards such as are used in the glass industry. He also indicated the need for standards for finish and suggested the establishment of three grades for evaluation of the finishes. The question arose concerning the measurement of finish and suitability of the profilometer for use as a means of measuring the degree of finish on a molded surface. As physical dimensions are rather easily measured, in most instances, a means of standardizing the reading of dimensions such as warpage was discussed.

The following outline of work was suggested for the committee:

1. Create an interest in quality control among the plastics industry.

A. Begin with the plastics molding industry.

B. When well enough along extend activities into plastics materials industry.

II. Collect examples of the successful use of quality control in this industry.

A. Increased interest in quality control should lead to increased data on the use of quality control.

B. Gather data on the expanded use of quality control.

C. Correlate data and divide into major divisions such as:

1. Dimensional control.
   a. Establishment of tolerances.
   b. Control of dimensions in molding.
2. Surface finish.
   a. Establish methods of measuring finish.
   b. Establish suitable industry tolerances.
3. Color.
4. Other characteristics — impact, physical strength, electrical, chemical resistance, etc. — possibly all properties.

III. Integrate data concerning quality acceptance levels vs. fine, medium and coarse dimensional tolerances.

A. Example: if tolerance of .005 can be met 99% of the time, what tolerance can be met 95% of the time?

B. Coordinate activities with measurment standards groups to establish standard means of measurement, i.e., parallelism, angles, deep draws, warpage, etc.

C. Present visual standards of finish must be supplemented by accurate measurements in numerical terms such as color is at present.

IV. Ascertain monetary value of quality control.

A. In establishing practical design tolerances.

B. In establishing inspection standards.

C. In controlling scrap rate.

V. Publish quality control manual for use in plastics molding industry with established standards in such form as to make it possible for shop foreman to put quality control practices into effect in their plants.

In order to facilitate the work and to make it possible for each man to work in his field of interest, the following subjects were assigned:

Dale Amos and Fred Tulley, "Quality Control by Multiple Correlation in the Injection Molding Shop."

Louis Walter, "Quality Control Problems Peculiar to Large Moldings."

Marion Arthur, "Quality Control Problems in Protective Coatings."

William Gobeille, "Quality Control Problems in Large Injection Molding."

The possibilities of eventually publishing a quality control manual were given serious consideration but emphasis was made on the fact that any such manual, to be of service to the industry, must be written on a level suitable for a molding plant operator.

Great emphasis was laid on the need for additional members of this committee. It was felt that the Quality Control Committee should be expanded to at least twenty-five members in order that individual problems can be assigned to two or more members at the same time. ANYONE, WHETHER HE IS A MEMBER OF SPE OR NOT, WHO IS INTERESTED IN THE WORK BEING UNDERTAKEN BY THE COMMITTEE OR WHO HAS DATA THAT IS NEEDED BY THE COMMITTEE IS URGED TO CONTACT JEROME FORMO, MINNEAPOLIS-HONEYWELL REGULATOR COMPANY, 2753 FOURTH AVENUE SOUTH, MINNEAPOLIS, MINNESOTA.

Some members voiced the opinion that these meetings should be held more than twice a year. At the end of the meeting, the general feeling was that there is a great deal of work to be done and the work, when it is done will be of great value to SPE and of even more value to the plastics industry.

Intricate Molds? The mold for the brush handles shown at the left *(courtesy Fuller Brush Company)* required not only intricate design, but ultra-smooth finish to meet today's mass production needs. Our sound engineering experience and modern equipment and methods are the answer. *WRITE FOR LITERATURE.*

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STYRENE INJECTION MOLDING DESIGN TOPIC AT NEW YORK—NEWARK MEETING

By ARTHUR M. MERRILL

The New York Section were hosts to the Newark Section at a joint dinner meeting on October 19 at the Hotel Shelburne, one of the most successful meetings in the New York Section's history. Approximately 150 members and guests of the two groups attended the meeting which included a cocktail hour, dinner, business meeting, and technical session. Featured speaker at the technical session was Grant W. Cheney, plastics technical service, Dow Chemical Co., who discussed "Injection Molding Design of Polystyrene."

Grant W. Cheney

Mr. Cheney's talk covered fundamental considerations in the injection molding of polystyrene and, in particular, the following five important factors: (1) control of plastic flow in the cavity; (2) mold temperature control; (3) sticking of parts in the mold; (4) restricted gating; and (5) gate balance.

Control of plastic flow in a cavity is largely a matter of having the correct section thickness so arranged with respect to the gate that the plastic reaches all areas of the mold at the proper time. Factors influencing this flow are therefore the design of the part being molded, variations in thickness of the part, size and type of runners, and size, type, and position of gate, in addition to the standard molding variables of temperature and pressure. Mr. Cheney discussed the effect of each variable, using slides to illustrate results obtained, and gave recommended dimensions for runners and gates.

Adequate mold temperature control requires that the entire surface of the mold cavity must be maintained at the proper temperature, with variations not exceeding 5-10°F. For polystyrene, relatively high mold temperatures (150-190°F.) usually assist in making stronger bonds, allow the use of lower plastic temperatures, minimize the occurrence of silver streaks or splay marks, and improve the temperature and craze resistance of the molded part. The temperatures of the two halves of the mold should be separately controllable, but must not differ greatly if cooling strains are to be avoided. Since each mold half should have a uniform temperature all over, a large volume of heat exchange fluid must pass through the mold. If at all possible, the heat exchange fluid channels should be in the block of steel which is to have its temperature controlled, not in a plate behind it. Cooling of the molds also requires the use of a large volume of cooling liquid, since a small flow of relatively cold water causes a considerable temperature variation throughout the length of the cooling channels.

Sticking of polystyrene molded parts is a function of the part design and the molding temperature and pressure. Polystyrene is a compressible material; at 450°F. under an applied pressure of 16,000 psi., its volume is reduced by about 6.8%. In order to reduce the force which holds the mold shut, shrinkage of the plastic must be sufficient to do two things: (1) it must alleviate the tendency of the plastic to expand to the extent that it has been compressed by the applied pressure; and (2) it must allow the mold walls to return to the unstrained position. If the actual plastic pressure in the cavity is not too high, shrinkage will ordinarily be sufficient to allow both of these actions to occur and the parts will release readily from the cavity.

Advantages of restricted gating in the injection molding of polystyrene include: ease and convenience of trimming the gate; reduction of residual molding stresses, particularly in the area near the gate; reduction of warpage; increased craze and temperature resistance; shorter molding cycles in some cases; permits use of wider range of mold temperatures; reduces necessity for cold slug trap; and reduces actual plastic pressure in the cavity in some cases. Recommended sizes and positions of restricted gates were given by the speaker, with slides used to illustrate their application to actual parts.

Balanced gating on multiple cavity shots is extremely important to insure that all cavities fill uniformly, particularly when restricted gating is used. Gate balancing may be accomplished by adjusting the cross-sectional area of the gate slightly, or by adjusting the length of the restricted portion by a somewhat greater amount. It is not possible to do a proper job of balancing gates, however, unless the mold temperature is somewhere near the optimum over the entire surface of the mold.

The talk, which corresponds to a paper by Cheney that will appear in a future issue of India RUBBER WORLD, was very well received and elicited a lively and lengthy discussion, with many questions brought forth from the floor.

In the business meeting following the dinner, New York Section president Stanley Bindman, Noma Electric Corp., welcomed the Newark members to the meeting and expressed the hope for increased attendance of each section's members at each other's meetings in the future. Plans for the New York Section to establish a committee of experts to answer molding questions were discussed, as were plans to set up an employment clearing house. The Newark Section was invited to participate in this clearing house. Reports were also heard from New York Section secretary George Baron, Ideal Plastics Corp.; membership committee chairman George Rice, American Cyanamid Co.; and program committee chairman G. Palmer Humphrey, G. P. Humphrey Plastics. Officers of the Newark Section present were introduced, including president Harold E. Frutchey, Thomas Mfg. Co., and secretary Ed Soules, Detroit Mold Engineering Co., as were also some of the distinguished guests.

Table favors in the form of plastic novelty piggy banks were distributed through the courtesy of Tech-Art Plastics Co., Inc., and the meeting concluded with a drawing for door prizes contributed by American Molding Powder & Chemical Corp., Bakelite Corp., and A. Bamberger Corp.

The New York Section held its next dinner meeting on November 16 at the Hotel Shelburne, 37th St. & Lexington Ave., New York City. Featured technical speaker at the meeting was Walter Topel, Parker Kalon Co., who discussed "Fastenings for Plastics." The meeting comprised a cocktail hour at 6 P.M., dinner at 7 P.M., and technical meeting at 8 P.M., in addition to the distribution of table favors and door prizes.

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West Warren, Mass.

1950 CONFERENCE

JAN. 11-13 CLEVELAND

FIBERS AT PHILLY

By RICHARD B. BISHOP

The **PHILADELPHIA SECTION** of the Society of Plastics Engineers held their monthly meeting on October 18, 1949 at the Franklin Institute. The speaker was Mr. Gerald A. Albert, Assistant Production Manager, National Vulcanized Fibre. His subject was Vulcanized Fibre and Phenolite.

Two colored films illustrating the commercial operations in manufacture of these materials were shown. Mr. Albert then spoke on the propteries and illustrated numerous applications of his company's products.

Mr. Alberts in his talk stated that vulcanized fibers (mascerated rags repolymerized with zinc chloride) are almost 100 years of age and are a work horse in the plastics industry because of toughness, durability and exceptional electrical properties. Phenolite on the other hand is newer and is a base (paper, rags, glass wool, etc.) bonded with a resin. The base varies the properties as does the amount and type of resins. By a constant study of the variables Vulcanized Fibre is daily custom making products to fit customer specifications.

The dinner which preceded the meeting was attended by 65 members and guests. They were given our usual well catered dinner and were treated to some fine door prizes donated by Vulcanized Fibre, Michigan Molded Plastics, and A. D. Callabro Company.

The Philadelphia Section will no longer meet in the Franklin Institute for the 1949-1950 Season. Our meeting will be at the University Club and will be on the first Monday of the month.

At the meeting on November 7, Mr. D. S. Plumb, Assistant Sales Manager Vinyl Resins Dept., Monsanto Chemical Co., spoke on "Plastics in Fabric Coating." The talk was a summary of the trend in textile coating since the end of the war. Particular emphasis was placed on the use of vinyl resins, both with a statistical survey and a discussion of the technological advantages and disadvantages of these materials in the various end uses which they now serve.

Durez Properties Chart

A new properties chart for the protective coating resins, produced by Durez Plastics & Chemicals, Inc., North Tonawanda, New York, is now available to the paint and varnish industries. The chart lists the physical properties, viscosities in oil and toluol, solubilities in solvents, compatabilities with wax and ethyl cellulose, and the suggested end uses for the resins.

It is available in two sizes. One is designed for the laboratory wall and is 20 by 31 inches, printed in two colors. The other is 8½ by 11 inches, printed in one color, and suitable for ring binders and file folders.

Also announced by Durez are newly compiled data sheets on Durez 220 and 220-V Protective Coating Resins. Comprising 10 and 8 pages respectively, the folders contain information on the properties of the resins.

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Ask for Bulletin K-200 which is a brief picture story of how Imperial Molded operates. Also Bulletin K-100 showing stock pulls, knobs and handles.

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Pennsylvania Personalities

By PAUL C. ROCHE

William J. Phillips played a dirty trick on his friends by taking a leisurely autumn trip eastward with the Mrs., while the rest are plagued with the knowledge that 1949 vacations are dead ducks and 1950 is untouchable as yet. (Bill is president of Presque Isle Plastics Inc., of Erie.) While the trip was said to be one of pleasure and business, we wonder if the later was limited to contemplating with pride the operation of their new Watson-Stillman 48 ounce injection molding machine.

In keeping with Pennsylvania week, The Erie Resistor Corp. held an open house on Tuesday October 18, 1949. Whereas invitations were abundant among customers and friends they were rather scarce with other local molders. This fact will go unnoticed, however, since "E.R.C." is a year round good neighbor and participates in reciprocity and fair practice to that extent which gives us pleasure to list them as competitors. Headed by G. Richard Fryling, President, our SPE members at Erie Resistor are many.

Business began to thin out among the tool builders in the 2nd and 3rd quarter of 1949. Observing that price levels were close to the bone and delivery requirements were nightmares to think about, William R. Byrd, President of Byrd Tool and Mold Co. of Erie met this problem by putting on a second shift. If you don't get it, please let us state merely that "Byrd Tool" in their new plant is now operating at a comfortable backlog of work (two shifts, that is).

This correspondent's father was a builder, but none of those talents rubbed off on the generation that followed, it is regretfully stated having purchased a house last winter and having set out to change everything as is the uncontrollable whim among home buyers. A parallel of this situation is becoming apparent between my generation and the next. A short time ago, when taking my two sons fishing for the first time, they threw their hooks into the water and after a few minutes of pensive waiting the older (4) spoke up firmly and said "Daddy, I don't want to catch no plastic fish."

Klippings From Kozy

By WALTER KOZY

Chemical Engineer, Lyon, Inc.

Entry of a new firm in the resin impregnated materials field was recently announced by T. W. NOBLE, general manager. The new organization, Plastic Specialties Co., 1310 West Road, Trenton, Michigan, will produce a wide range of resin treated materials, including papers, fabrics, sheeting, Fiberglas cloth, and mat. These materials will find their way into such customer applications as laminates for bar, counter, and table tops, trays, plaques, wallboards, etc. Materials for items such as filter media, radio parts, aircraft tools, etc., will also be produced.

Mr. Noble was formerly general manager and technical director of the Morart Gravure Corp. of Holyoke, Mass., and previous to this was general manager of the Plastics Division of Fabricon Products, Inc., in River Rouge, Michigan. He is a former president of the Detroit Section of the Soc. of Plastics Eng'rs. and is a member of the Society of Plastics Industry.

The recent fire at Imperial Plastic Products, Inc. 4436 Walker Ave., Wayne, Michigan, will not interfere with the continued operation of the company according to W. G. Leowellen, president. The fire, which started by spontaneous combustion in a pile of old wiping cloths, did an estimated damage upwards of $2000. Imperial Plastic Products are fabricators of plastic signs and displays and are equipped for long and short runs in wood, plastic, or masonite products.

A. R. GABLE, president of the Midland Plastic Molding Co., of Midland, Michigan, announces the opening of a Detroit office at 14258 Appoline Ave., to better service the automotive and allied industries in the Detroit area. A complete custom molding service specializing in thermoplastics will be offered.

The responsibilities of **MR. WHITING N. SHEPARD,** general sales manager of Plaskon Division, Libbey-Ford Glass Co., have been broadened to include direction of all sales activities of the organization. Mr. Horton Spitzer has been appointed to the newly created post of director of eastern promotional sales for the company.

MR. J. P. HEALY, 291 Delaware Avenue, Buffalo, N. Y. (phone Madison 3331) has been appointed District Manager for the State of New York, exclusive of Metropolitan New York City, for Manco Products Company of Melvindale, Michigan, fabricators of TRU-CAST Beryllium Copper cavities for plastic, rubber and die cast dies.

ACETATE-BUTYRATE

(Continued from page 6)

the gold yarn is combined with other fibers.

Weaving Lurex with wool and cotton yarns and finishing the fabric in the piece without affecting the Lurex is an outstanding achievement. "Metalene," a material consisting of wool yarn and Lurex, made in many different colors, is a popular priced dress material. The fabric is light in weight, soft, non-tarnishable and easily dry cleaned. The applications that exist for this material illustrates the versatility of the cellulose ester film and sheets.

During the intermission of Mr. Howe's discussion we saw a demonstration of electronic sealing machines by Mr. R. S. Mongel, of the Spectrum Manufacturing Company.

The Baltimore-Washington Section enjoyed Mr. Howe's talk and hope that he will honor us again soon.

PLASTICS MOLDINGS

(Continued from page 5)

ing pressures, the envelope may be made of rubber, and the evacuated unit cured in an autoclave.

POSTFORMING. Certain of the phenolic and polyester laminates soften when reheated rapidly to temperatures well above their curing temperature. In postforming the reheated laminates are quickly deformed to the desired shape by clamping in jigs, and held until cool. These jigs often exaggerate the shape to compensate for spring back. Metal jigs provide rapid cooling, while reinforce plastic jigs are common for slower cooling.

Postforming stock has a good surface finish, and with good processing the postformed parts will give good surfaces. Most stock for postforming is about one-sixteenth inch thick.

A variation of post forming, called hot forming, has the forming jigs located near the laminating press. Laminates are pulled hot and quickly transferred to jigs, where they remain until cool.

CASTING. This term is generally used to describe the curing of thermosetting resins containing little or no reinforcement, and with no applied molding pressure.

Since little or no reinforcement dilutes the exothermic of the curing resins, and since castings tend to be massive in size, cure cycles may be slow.

Phenolic resins, activated by acid catalysts, cure on carefully controlled time-temperature cycles of up to several days. Polyesters cast in massive metal molds may cure in a few minutes if the pieces are small and if a milder catalyst is used to release the exothermic heat more slowly. Some of the thermoplastics are cast by polymerizing special formulations.

PIN-POINT GATING IS TOPIC AT WNE

Members Petretti, Whitehead and Dunn Promoted

By GEORGE W. MARTIN

The **WESTERN NEW ENGLAND SECTION** of the Society of Plastics Engineers held their first meeting of the fall season, Wednesday, October 5th, 1949. The meeting was held at the Hotel Sheraton, Springfield, and was presided over by Section President, Mr. Sherwood Young.

During the business meeting that followed the dinner, announcement was made of the appointment of Mr. Mortimer Nickerson of DeBell and Richardson, as Section Director to fill the vacancy left by Mr. John Brown, who was recently appointed Research Director of Lambert Pharmaceutical Company of St. Louis, Mo. Mr. Ed. Vaille, Section Secretary will take over Mr. Brown's duties as Treasurer for the balance of the year.

Announcements also were made of the promotion of three of the Section's prominent members—Mr. Mario Petretti, who recently assumed the duties of Assistant to the President, in charge of production, at the Rogers Plastic Corporation, West Warren, Mass.; Mr. George Whitehead, recently promoted to the Sales Manager of Plastic Machinery Division of Improved Paper Machinery Corporation, Nashua, N. H. and Mr. James Dunn, recently promoted to General Plant Superintendent, Molding Division, Church Mfg. Company, Monson, Mass.

Constitution and By-law brochures prepared by National Society Headquarters, were distributed to various committee chairmen and door prizes were awarded to both guests and members. The prizes were the compliments of American Optical Company.

The business meeting was then adjourned and the President introduced Mr. James S. Wilson as the speaker of the evening. Mr. Wilson, Manager of Plastic Machinery Sales, Watson Stillman Company chose for his subject, "Pin Point Gating in Injection Molding."

The speaker, whose entire working career of thirty-one years has been devoted to the plastic industry, felt that the credit for this type of molding should be given to the Pacific Molders.

He first learned of it about one year ago from the Pacific Molders who were at that time successfully using this method. Mr. Wilson devoted his entire talk to the technical aspects of the method, stressing the importance of back-tapered nozzle openings, round shaped runners—cut half in each side of die—and a ball radius at the gate entrance. He recommended that the runner be cut as close to the cavity wall as is practically possible to reduce the gate size to a minimum, preferably .030" to .040".

The gate itself can be either round or flat, with the speaker recommending no greater area than .0008 square inches.

Along with pin point gating goes also the importance of proper coring and heating, about 140°F to 150°F.

In conclusion, Mr. Wilson pointed out that the definite advantages to this method of molding, are not only the tremendous saving in the finishing operation of the molded part, but also a marked improvement in finish of the part and substantial reduction in pressure.

The talk was very well received by a record sized audience and a lengthy and informative discussion concluded the evening.

TECHNICAL CONFERENCE
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EDUCATION GROUP TO ASK STUDENT SECTIONS

The Education Committee of S.P.E. met at Princeton October 21st. As items of general interest Prof. L. F. Rahm, Chairman, announces that the Committee will ask the Society to consider the establishment of Student Chapters of S.P.E. at various schools throughout the country. Also, the members of the Society will be solicited to participate in the work of the Education Committee through regional meetings devoted to plastics engineering education and through direct questioning in regard to professional education in plastics.

WATSON-STILLMAN

E. A. Stillman, President of the Watson-Stillman Company, Roselle, New Jersey, hydraulic machinery manufacturers since 1848, announced recently the appointment of **FRANK G. HELANDER** as Executive Vice President of the Company. In 1943 Mr. Helander joined the Watson-Stillman organization as Mid-West Sales Manager of the Hydraulic Machinery Division with headquarters in Chicago. From 1936 to 1943 he was connected with the Carnegie-Illinois Steel Corporation in engineering at the Youngstown and Homestead Works, and later served as Chief Engineer of the Ordnance Engineering Bureau of the Corporation at Pittsburgh, Pennsylvania. Earlier associations from 1924 to 1936 were with Gibbs and Hill, Consulting Engineers of New York, and the Reading Company at Philadelphia.

Walter L. Barker, President of the Improved Paper Machinery Corporation, Nashua, New Hampshire, announces the appointment of **GEORGE W. WHITEHEAD,** as Sales Manager of the Plastic Molding Machinery Division. Mr. Whitehead has been associated with the company for the past five years in the capacity of developing, servicing and selling of the Impco plastic molding machinery. Prior to joining the Improved organization, he was associated for thirteen years with the Monsanto Chemical Company Plastics Division and for four years previous to that, with the Hercules Powder Company.

MARTIN COMPANY ELECTS

Election of three new members of The Glenn L. Martin Company's Board of Directors was announced after the Board's September meeting at Baltimore, Md.

The new directors are Harvey J. Gunderson, a director of the Reconstruction Finance Corporation, Washington, D. C., Chester F. Hockley, president of the Davison Chemical Corporation, Baltimore, and Daniel A. Evatt, vice president-finance of the Martin Company.

Principal officers of the company, in addition to Mr. Martin, Mr. Pearson and Mr. Evatt, are G. T. Willey, vice president-manufacturing; D. R. Shoults, vice president-engineering; Robert H. Kittner, vice president-Chemicals Division; Joseph C. Little of Jones, Day, Cockley and Reavis, Cleveland, Ohio, secretary; Earl R. Uhlig, controller, and William L. Lucas, treasurer. Mr. Willey and Mr. Little previously also served on the Board of Directors.

MILLER WITH BRIGGS

MR. W. J. MILLER, at one time connected with the advertising department of Rohm and Haas, is now connected with the advertising agency of J. Branck Briggs. The agency is equipped to handle every phase of advertising—merchandising, sales promotion, public relations, publicity, radio, etc. Mr. Miller will be remembered for his work with the 1949 Technical Conference that was held in Philadelphia.

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1950 TECHNICAL CONFERENCE

January 11-13

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Bring your problems for discussion and keep abreast of the times.

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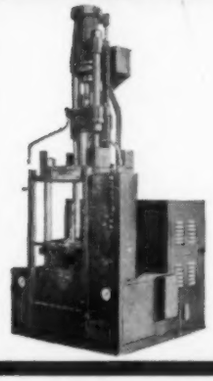
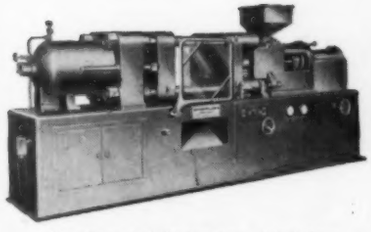
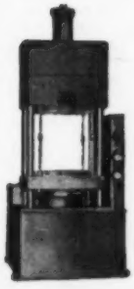


Vertical Injection Molding Machines 1, 2, and 4 Ounces



Horizontal Injection Molding Machines 8 to 80 Ounces

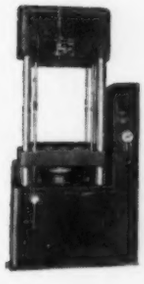
Preform Tableting Machines 10 and 100 Tons



Transfer Molding Machines 30 to 1200 Tons

General Purpose Presses 20 to 200 Tons

Compression Molding Presses 50 to 1200 Tons



S.P.E. Journal

Official Publication of The Society of Plastics Engineers, Inc.
409 Security Bank Building
Athens, Ohio

POSTMASTER: Forwarding and Return Postage Guaranteed.

Section Notes

The **NEWARK SECTION** joined the New York Section on the night of October 19th in the yearly joint meeting to hear Mr. Grant Cheney, The Dow Chemical Company, Plastics Technical Service Division, talk on various aspects of molding and die designing for polystyrene. The talk was well presented before approximately 140 members and guests, of which 70 represented the Newark Section.

The November meeting of the Newark Section of the Society of Plastics Engineers was held at the Military Park Hotel on November 9. The speaker was Mr. Wyman Goss of the Chemical Dept. of the General Electric Co., whose subject was—"Some Recent Phenolic Developments." In addition, Mr. Islyn Thomas gave a brief talk regarding his trip to Europe.

The **CHICAGO SECTION** met with the S.P.I. Midwest Chapter on November 9 to hear Albert J. Smith of Fyffe and Clark, general counsel to the National Metal Trade Association and the Illinois Manufacturers Association, speak on Current Labor Trend in the Chicago Area. The Formica Company's new film "Living with Formica" was also shown.

"Pop" Murray, Plaskon Division, spoke to the **TOLEDO SECTION** on "Alkyd Molding Compound" on November 15th in the O.I.G. Clubrooms. The meeting was followed by a delicious, free buffet supper.

The **WESTERN NEW ENGLAND SECTION** heard John M. DeBell, president of DeBell & Richardson, Inc., speak on "The Japanese Slant on Plastics" on November 2. Mr. DeBell has just returned from an extensive trip through Japan.

On November 8, **THE DETROIT SECTION** saw the film "The Nature of Plastics" which was filmed in England. The chemistry of plastics was made up so all could understand it. Mr. W. J. Connelly, Manager Consumer Relations Dept., Bakelite Corp., discussed the film as it was presented.

THE EASTERN NEW ENGLAND SECTION met at the Hotel Vendome, Boston, on November 3rd to hear Dr. S. J. Baum, President of the American Polymer Corp., speak on "Emulsion Polymerization." Dr. Baum is a recognized authority on the dispersion and emulsion polymerization and an interesting discussion followed his speech.

NORTHWESTRN PENNSYLVANIA heard Florian G. Miller speak on "Patents, Licences, Agreements, Royalty Payments as they effect the Plastics Industry," on Thursday October 13th at Angelotti's. A movie, "Science of Measurement" by L. S. Starrett Film was shown after the speech.

THE TOLEDO SECTION met on October 12th to hear Mr. E. Borro, Durez Plastics and Chemicals, speak on Low Compression Molding of phenolics.

On October 26th the **QUEBEC SECTION** heard Mr. Gordon B. Thayer speak on Controlled Flow and Balanced Gating In Molding Thermoplastics. The meeting was held in the C. I. L. Amphitheatre in Montreal.

How imaginative engineering has contributed to the growth of the plastics industries was the theme of the talk by Howard S. Bunn, Vice-President of Bakelite Corp. before the **SOUTH TEXAS SECTION** on October 19. The talk, entitled "This Business of Plastics," stressed injection molding and extrusion of Vinylite plastics and Bakelite polyethylene as they have been applied to the manufacture of outstanding products. The talk was illustrated by slides and exhibits.

Redman's Club was the scene of the **ROCHESTER SECTION** meeting on October 18. A panel discussion was on Finishes, Adhesives, Underwriter's Requirements and Testing Procedures. The panel was made up of four members of the section and the questions were submitted by the membership. $1.00 was paid for the first ten questions submitted and $2.00 was paid for any question that stumped the experts. After the discussions the National Vulcanized Fibre Corporation's films "A Million Uses" and "Phenolite" were shown.

THE SAINT LOUIS SECTION heard Mr. M. A. Nichols, President, Manco Products Co., Melvindale, Mich., speak on "Why Beryllium Copper." Mr. Nichols is an authority on the use of beryllium copper and has been responsible for much of its increased use by all industries.

"Nylon" was the subject discussed before the **BUFFALO SECTION** by Dr. Oliver W. Cass of the E. I. duPont de Nemours & Co. on October 26th at the Park Lane Restaurant. The talk was accompanied by an exhibit and movies. The Buffalo Section has recently changed its meeting date to the Fourth Wednesday in the month.

A.S.R.E. PLASTICS MEET

A special engineering conference on the use of plastics for household refrigerators will be held at the 46th Annual Meeting of the American Society of Refrigerating Engineers to be held December 4 to 7, 1949, at the Edgewater Beach Hotel in Chicago. Plastics are used in household refrigerators for inner doors, vegetable and meat pans, breaker strips or frames, evaporator doors and baffles, and decorative trim.

This is the third conference on household refrigerators held at recent national meetings of the Society but will be the first to devote all its attention to plastics. The conference will be opened with the presentation of a technical paper by O. H. Yoxsimer, manager of the cabinet engineering department of Westinghouse Electric Corp., on the general use of plastics in refrigerators to be followed with specific discussions by engineers who represent manufacturers of household refrigerators, users of refrigerators, suppliers of plastics, plastic fabricators, etc.

The ASRE invites any engineer or person interested in the use of plastics in refrigerators to take part in the conference which will be open to all registered members and guests of the Society.